

U.S. Patent Application Serial No. **10/015,564**
Amendment filed February 12, 2007
Reply to OA dated November 15, 2006

REMARKS

Claims 26, 28 and 30-58 are pending in this application. An amendment is proposed herein amending claims 31 and 38 and adding new claims 59-68. Upon entry of this amendment, claims 26, 28 and 30-68 will be pending.

The applicant respectfully submits that no new matter has been added. Support for the amendments to the claims is detailed below. It is believed that this Amendment is fully responsive to the Office Action dated **November 15, 2006**.

The molar ratios of polyfunctional compound (B) to meta- or para-xylylenediamine (A) of from 0.3 to 0.95 set forth on page 16, lines 5, 6 and 9 as well as claims 31 and 38 would be more concisely denoted as 0.3:1 and 0.95:1 since the molar ratio could be misinterpreted as 0.3:0.95. (Office action paragraph no. 3)

The objection is overcome by the amendment to claims 31 and 38, which amends the terminology for the ratios as suggested by the Examiner.

Claims 31-33 and 38-47 are rejected under 35 U.S.C. 103(a) as being unpatentable over Japanese Patent Nos. 8-104738 and 63-301264 in view of Carlblom et al. Patent No. 5,728,439 and Huang et al. Patent No. 3,683,044. (Office action paragraphs no. 3-6)

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Reconsideration of the rejection is respectfully requested in view of the amendments to the claims and the attached Declaration under 37 CFR 1.132 by Shuta KIMURA, signed January 25, 2007.

Regarding the amendment to claim 31: In claim 31, line 4, “comprising” is amended to --consisting essentially of--. In lines 6 and 7, two occurrences of “consisting essentially of” have been amended to --consisting of--.

Regarding the amendment to claim 38: In claim 38, line 5, “comprising” is amended to --consisting essentially of--. In lines 7 and 8, two occurrences of “consisting essentially of” have been amended to --consisting of--.

The amendment that the composition for coating is “consisting essentially of coating forming components of an epoxy resin and an amine curing agent” excludes other components affecting the basic and novel characteristics of the composition. This amendment is supported by the general disclosure of the specification on page 17, last line, though page 20, which indicates that other components such as wetting agent, solvents and pigments **may** be added, and therefore need not be present.

Claims 31 and 38 have also been amended: “said amine curing agent consists **essentially** of a reaction product obtained from reactants consisting **essentially** of the following (A) and (B) ...” This amendment excludes other components than (A) and (B) from the reactants used to make the amine curing agent. Support for this amendment may be found, for example, on page 13, lines 8-10, where it is stated that the amine curing agent “is a reaction product of the following (A) and (B) or

(A), (B) and (C).” That is, one of the possibilities is a reaction product of (A) and (B), with no other reactants.

(1) Regarding cited Japanese Patent No. 8-104738A

The Examiner states that: “Japanese '738 (translation page 5, paragraph 30), shows Amine F” (page 3 of the office action). The Examiner refers to the computer translation of JP08-104738A. However, Applicant submits that the computer translation does not reflect the original precisely (Applicant also noted this in the Response dated February 28, 2006). Applicant therefore refers to the English translation of this reference that Applicant submitted in the Response dated February 28, 2006.

JP08-104738A discloses a curing agent for epoxy resin comprising a polyamine compound (A) containing at least one compound selected from xylylenediamine, a modified product obtained by Mannich reaction of xylylenediamine and a phenolic compound or an aldehyde compound, a modified product obtained by the reaction of xylylenediamine and an epoxy compound, a modified product obtained by the reaction of xylylenediamine and a compound having a carboxyl group(s) and a modified product obtained by Michael reaction of xylylenediamine and an acrylic compound and a fatty amine compound (A), (claim 1, paragraphs [0007] ~ [0008]).

Further, JP08-104738A discloses an epoxy resin composition consisting essentially of the above-mentioned curing agent for epoxy resin and an epoxy resin (claim 4, paragraph [0007]).

JP08-104738A describes at paragraph [0007], lines 1 to 2, that **the invention has a feature that the fatty amine compound is contained in the curing agent for epoxy resin.** “The fatty amine compound (B) to be used is primary amine, secondary amine and tertiary amine compounds having preferably at least 8 carbon atoms which are produced using mainly fatty acid or higher alcohol as a raw material, among which a compound with primary amine is more preferable” (paragraph [0017], lines 2 to 7).

Thus, the curing agent for epoxy resin in JP08-104738A contains both polyamine compound (A) and fatty amine compound (B) as indispensable components.

Amine E of a reaction product of xylylenediamine and acrylonitrile and amine F of a reaction product of xylylenediamine and methylmethacrylate are disclosed in Reference Examples 5 and 6, respectively (paragraphs [0029], [0030]). Each of the polyamines is mixed with a fatty amine compound and a diluent in the proportion shown in Table 2, whereby each curing agent for epoxy resin is prepared ([0031], Table 2).

The curing agent for epoxy resin shown in Example 12 in JP08-104738A is a mixture of 95 parts by weight of amine E, 5 parts by weight of hexadecylamine and 25 parts by weight of benzyl alcohol (Table 2). The curing agent for epoxy resin shown in Example 13 is a mixture of 98 parts by weight of amine F, 2 parts by weight of hexadecylamine and 25 parts by weight of benzyl alcohol (Table 2).

Thus, each of amine E and amine F corresponds to polyamine compound (A) described in the claims and paragraphs [0007] ~ [0016] of the reference.

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Hexadecylamine corresponds to fatty amine compound (B) in the claims and paragraphs [0007], [0008], [0017] ~ [0019] of the reference.

The fatty amine compound (B) in JP08-104738A has preferably at least 8 carbon atoms and its examples include primary amine compounds such as octylamine, dodecylamine, coconut alkylamine, tetradecylamine, hexadecylamine, octadecylamine, hardened beef tallow alkylamine, beef tallow alkylamine, oleylamine, soybean alkylamine and dimer amine ([0018]).

The mixing ratio of polyamine (A) to fatty amine compound is 2 to 8 parts by weight of fatty amine compound (B) per 100 parts by weight of polyamine (A) (claim 2, [0020]).

Applicant previously submitted a declaration including experimental data in the Response dated November 2, 2006, which will be referred to as "Declaration I."

The Examiner's comments in paragraph no. 4 of the Office action dated November 15, 2006, suggest that the Examiner may have misunderstood the contents of the Declaration I.

The Examiner states that Declaration I : "attempts to compare Example 3 (specification, page 37) containing 33 parts by weight (pages 36-37) of amine curing agent A prepared from metaxylylenediamine and methyl acrylate (pages 29-30) and 50 parts by weight of the tetraglycidyl ether of meta-xylylenediamine TETRAD-X, with a Comparative Example 9 wherein octadecylamine is mixed with amine curing agent C of Japanese' 739 (the reaction product of meta-xylylenediamine and dimer acid)."

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However, Applicant first notes that “33 parts by weight of amine curing agent A in Example 3” is incorrect. In Example 3, as described on page 37 of the specification, 57 parts by weight of amine curing agent C on page 30 to 31 of the specification was used.

In addition, the Examiner is incorrect that Comparative Example 9 uses “Amine curing agent C of Japanese '739.” In Comparative Example 9, amine curing agent C from page 30 to 31 of the specification was used.

To clarify Applicant's arguments regarding these data, Applicant submits herein a new Declaration under 37 CFR 1.132, by Shuta KIMURA, signed January 25, 2007, which will be referred to as “Declaration II.” As demonstrated in Declaration II, when an amine curing agent C' obtained from a uniform mixture of fatty amine compound (B) disclosed in JP08-104738A and the amine curing agent C (a reaction product of methylenediamine and methyl acrylate) (pages 30 to 31 of the specification) is used for preparation of coated film, the gas barrier property of the coated film deteriorates and is inferior to that of the coated film of the present invention prepared using only amine curing agent C (pages 30 to 31 of the specification).

Generally, a material having an oxygen permeability of 20 to 30 ($\text{cc/m}^2 \cdot \text{day} \cdot \text{atm}$) or below is considered a gas barrier material. Therefore, the coated film obtained in Comparative Example 9 of Declaration II is not considered a gas barrier material since the oxygen permeability is 114 ($\text{cc/m}^2 \cdot \text{day} \cdot \text{atm}$).

Fatty amine compound (B) of In JP08-104738A is a primary amine compound. Therefore, fatty amine compound (B) reacts with an epoxy resin as a reactant in a curing reaction.

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In JP08-104738A, polyamine compound (A) was mixed with fatty amine compound (B) and the mixture thus obtained was maintained to a uniform state with heating and cooled to a room temperature, whereby the curing agent for epoxy resin was prepared (paragraphs [0020], [0031]). That is, at the stage of preparation of the curing agent for epoxy resin, polyamine compound (A) was mixed with fatty amine compound (B) to prepare a uniform mixture.

Amine curing agent of the present invention consists of a reaction product obtained from reactants consisting of (A) meta- or para-xylylenediamine and (B) specified polyfunctional compound.

Each of Amine E and Amine F in JP08-104738A is one component of the curing agent. However, as discussed above, the curing agent of JP08-104738A further contains fatty amine compound (B) as an indispensable component in addition to each of amine E and amine F. Thus, the amine curing agent recited in claims 31-33 and 38-47 is clearly distinguished from the curing agent disclosed in JP08-104738A.

(2) Regarding Japanese Patent Publication No. 63-301264A

JP63-301264A discloses a curing agent containing two components of a polyamide amine derived xylylenediamine and an acrylic derivative of xylylenediamine as main components.

Examples of the polyamide amine derived from xylylenediamine include a condensation product of (1) xylylenediamine and (2) **a polymerized fatty acids such as a [dimer] acid or a trimer acid, obtained by polymerized a fatty acid having an unsaturated bond such as linolenic**

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acid, oleic acid, linoleic acid, eladic acid or recinoleic acid (page 2, lower left col., lines 2 to 13, emphasis added).

In contrast, as discussed above, the amine curing agent of claims 31-33 and 38-47, as amended, **consists of** a reaction product obtained from reactants consisting of (A) meta- or para-xylylenediamine and (B) specified polyfunctional compound.

The amine curing agent of claims 31-33 and 38-47 contains no polymerized fatty acids such as a dimer acid or trimer acid disclosed in JP 63-301264A.

Further, in the present invention, the molar ratio of [(B)/(A)] is limited to 0.3:1 to 0.95:1. However, in the curing agent of JP63-301264A, there is no disclosure of a limitation on this molar ratio.

Thus, the amine curing agent of claims 31-33 and 38-47 is clearly distinguished from the curing agent disclosed in JP63-301264A.

(3) Carlblom et al., US Patent 5,728,439

Carlblom et al. discloses a gas barrier composition which is a mixture of polyepoxide (B) and initial polyamine (A) (col. 5, lines 51 to 56). Metaxylylenediamine is used as one example of the initial polyamine (A) (col. 6, line 5). The initial polyamine is pre-reacted to form an adduct (col 5, lines 57 to 58).

As one embodiment, the polyamine adduct is formed by reacting the initial polyamine with epichlorohydrin (col. 5, line 65 to col. 6, line 1).

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As another embodiment, the polyamine adduct is formed by reacting the initial polyamine with polyepoxide in which a plurality of glycidyl groups are linked to an aromatic member (col. 6, lines 9 to 12).

However, Carlblom et al. does not disclose the amine curing agent the amine curing agent of claims 31-33 and 38-47.

(4) Huang et al., US Patent 3,683,044

Huang et al. discloses a composition for coating comprising an epoxy resin and an amine curing agent, wherein the epoxy resin is an epoxy with a glycidylamine moiety derived from metaxylylenediamine, and that the epoxy resin can be cured by curing agent customarily used for curing glycidyl compounds.

However, Huang et al. does not disclose the amine curing agent the amine curing agent of claims 31-33 and 38-47.

As described above, the amine curing agent the amine curing agent of claims 31-33 and 38-47 is clearly distinguished from each curing agent for epoxy resin disclosed in JP8-104738A and JP63-301264A. Therefore, neither of these references discloses the amine curing agent of claims 31-33 and 38-47.

Thus, even if polyglycidylxylylenediamine disclosed in Carlblom et al. and Huang et al. is combined with each curing agent for epoxy resin disclosed in JP8-104738A and JP63-301264A, the coated film and the multilayered laminate having an excellent gas barrier property of claims 31-33

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and 38-47 would not result. Claims 31-33 and 38-47 are not obvious over Japanese Patent Nos. 8-104738 and 63-301264, Carlblom et al. Patent No. 5,728,439 and Huang et al. Patent No. 3,683,044, taken separately or in combination.

Regarding new claims 59-68.

Support in the specification for the recitation of claims 59-68 is as follows: The phrase "a non-reactive solvent, a catalyst and/or a tertiary amine selected from the group consisting of pyridine, picoline, lutidine and trialkylamine" in claims 59, 60, 65, 66, 67 and 68, is supported on pages 14 to 15. The tertiary amine is used as a promoter for the reaction. The phrase "an organic solvent, water, a wetting agent, a pigment and/or an inorganic filler" in claims 63, 64, 67 and 68, is supported on page 16, 18, 20.

All of claims 59-68 require that the "amine curing agent consists of a reaction product obtained from a mixture consisting of the following (A) and (B)" Applicant's arguments regarding the rejection of claims 31-33 and 38-47 over Japanese Patent Nos. 8-104738 and 63-301264, Carlblom et al. Patent No. 5,728,439 and Huang et al. Patent No. 3,683,044, are therefore applicable to claims 59-68.

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Reconsideration of the rejections and objections is respectfully requested.

If, for any reason, it is felt that this application is not now in condition for allowance, the Examiner is requested to contact the Applicant's undersigned agent at the telephone number indicated below to arrange for an interview to expedite the disposition of this case.

In the event that this paper is not timely filed, the Applicant respectfully petitions for an appropriate extension of time. Please charge any fees for such an extension of time and any other fees which may be due with respect to this paper, to Deposit Account No. 01-2340.

Respectfully submitted,

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